Demand Access Service
(DAS)

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Code 531

TDRSS 2nd Workshop

- Provide to TDRSS customers the ability to access Multiple Access Forward and Return services without prior scheduling

- Demand access MA service is for TT&C

- Orbiting customers

  - Near term communications needs (based on survey of existing customers)
    - Return data rate: Typically 32 kbps, potential for 128 kbps max.
    - Limited forward data needs (1 kbps for a few minutes several times/day)
    - For current customers, need for forward link contact time driven by tracking
    - Strong desire for rapid, reliable access to TDRSS (East and West) communications without forecast scheduling/User Planning System

- Non-orbiting customers - balloons, aircraft and UAV's

  - Continuous return link (4000 bps - 50,000 bps)

  - Infrequent commanding (with possible exception of voice applications)

- Semi-stationary customers

  - Potential for large numbers of semi-stationary customers (NOAA buoys)
  - Communications needs
    - Low return data rate (< 4800 bps), few minutes of return data each hour
    - Rare commanding

- Provide TDRSS MAF and MAR services
- Provide services in near real time
- Minimize cost of customer systems required for demand access
- Minimize operational complexity and effort for customer service access
- Support all classes of customers: stationary, suborbital (e.g., balloons, aircraft), orbiting spacecraft

(continued)

- Provide service to customer without prior scheduling
- Utilize TCP/IP protocol for all telemetry/commands for newer MOCs, encapsulated Nascom blocks for legacy MOCs
- Utilize NASCOM network to communicate to TDRSS customers
- Allow buffering option for commands (TCP/IP customers only)
- Queue requests for services on a FIFO basis
- Provide tracking services

TDRSS Spacecraft:

- MA forward link(s) via on-board beam-forming
  - 1 link per TDRSS F1-F7
  - 2 links per TDRS H,I,J

Operations Centers:

- Access MA forward service without prior scheduling
- Send commands/messages to DAP for near-real time broadcast to USAT

Operation Center 1

●
●
●

Operation Center N

Demand Access Processor (DAP)

SN GT

SN Infrastructure:

- Receives commands/control message data from each customer
- Performs protocol translation, buffers data
- Configures MA forward link
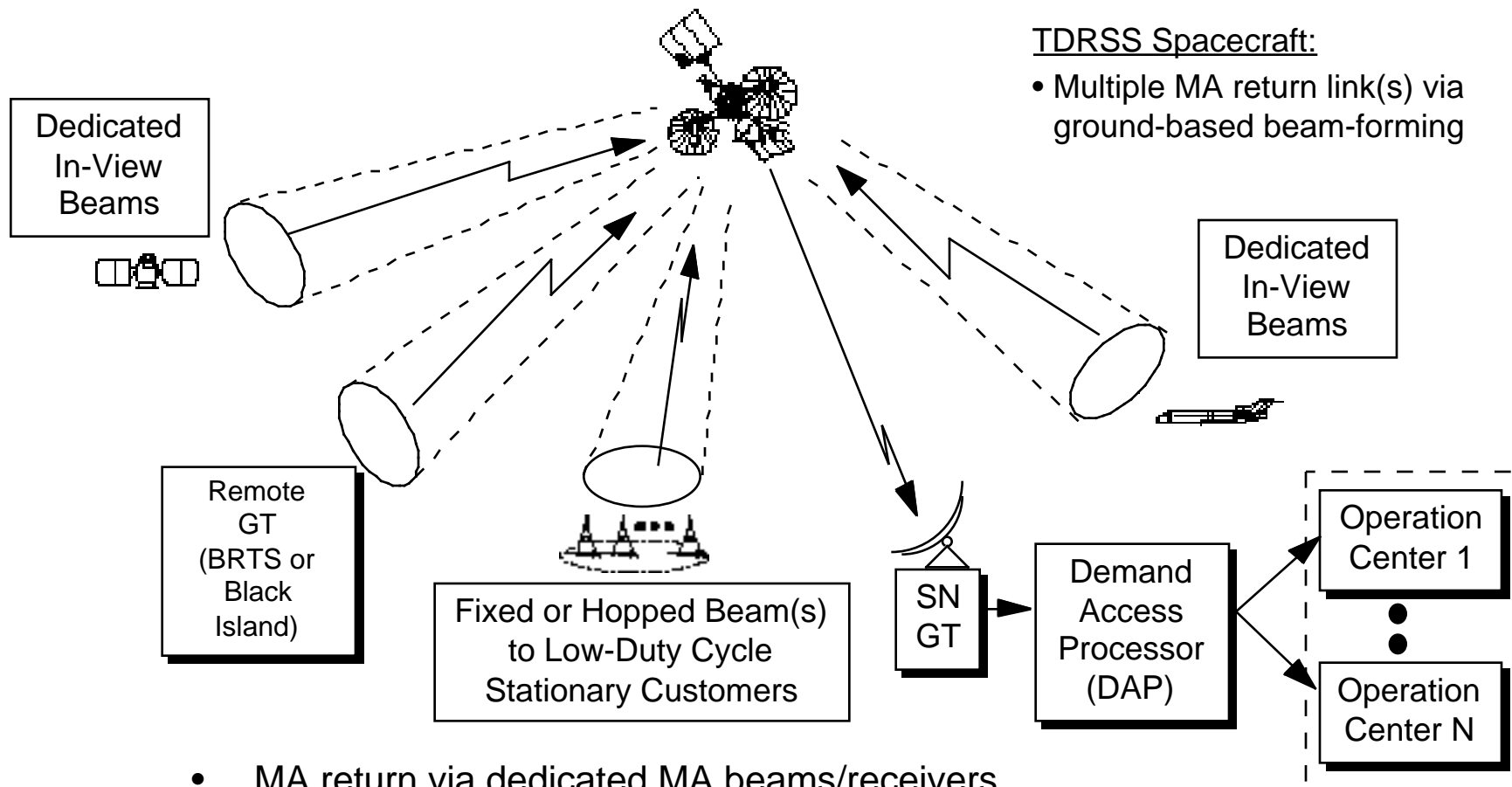- Transmits customer commands to USAT

USAT 1 ... USAT N

Stationary Customers (e.g. NOAA Buoys)

TDRSS Spacecraft:
- Multiple MA return link(s) via ground-based beam-forming

Dedicated In-View Beams

Dedicated In-View Beams

Remote GT (BRTS or Black Island)

Fixed or Hopped Beam(s) to Low-Duty Cycle Stationary Customers

SN GT

Demand Access Processor (DAP)

Operation Center 1

Operation Center N

- MA return via dedicated MA beams/receivers
- Support to stationary customers via shared beams
- Beamformer/receiver capacity can grow to accommodate increased usage

- Share MA resources with previously scheduled customers

- Automate service requests currently accomplished via telephone

- Utilize TDRS East, TDRS West & TDRS Spare

- DAP will schedule service via NCC, using TDRSS Unscheduled Time information to select windows of opportunity

- Minimum 6 minutes delay until service start (Ground Terminal constraint)

- Communicate via TCP/IP and Nascom block encapsulated customers

- Multiple Access Forward (MAF) Service
  - Customer selects service (utilizing TCP/IP protocol) via Demand Access Processor (DAP)
  - Customer sends spacecraft command, vectors, USERID
  - DAP returns message to indicate the earliest time service can begin
  - Customer has option to cancel service
  - Customer notified when command shall be sent (non-buffered) or is being sent (buffered)
  - Customer notified when transmission of command from DAP is complete
  - Customer verifies successful transmission via telemetry on dedicated return link

TDRSS

- Multiple Access Return (MAR) Service

  – Dedicated return service

  – Telemetry sent directly to customer MOC

  – DAP uses TCP connection to customer MOC to relay telemetry, or

  – DAP sends a message to direct customer to receive data via NASCOM

- Near real-time service (several seconds to service start)

- Compute visibility of TDRS to customer spacecraft and buffer commands until spacecraft is visible

- Emergency customer service

- Phased implementation

- Phase I scheduled for completion late 1997.

- System will evolve as new customers desire access

- 2 forward links available with TDRS H,I,J.

- Concepts/architectures/project status will be constantly updated on DAS home-page

  – "http://www530.gsfc.nasa.gov/das"

TDRSS